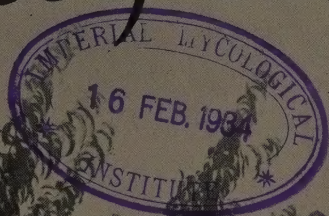


# Peach Leaf Curl



EXTENSION SERVICE  
STATE COLLEGE WASHINGTON  
PULLMAN WASHINGTON



# PEACH LEAF CURL

*Exoascus deformans*

B. F. DANA.

Department of Plant Pathology, Agricultural College and Experiment Station.

Peach leaf curl in the United States causes loss to the peach industry estimated to be \$2,500,000.00 to \$3,000,009.00 annually. In our own state it is more frequently reported than other peach diseases.

## Distribution

In the country at large, leaf curl is more serious near bodies of water where the spring weather is cool and damp. There is correspondingly less of the disease in the drier inland regions. The number of reported cases corresponds very closely with the importance of the disease in the various sections. Reference to the

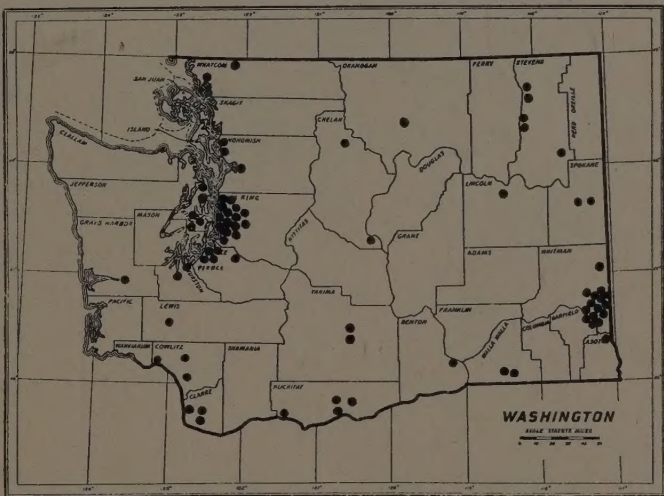


Fig. 1 Recorded occurrences of leaf curl for the seven year period 1915-1921 inclusive.

map (Fig. 1) will show that the disease is of frequent occurrence in Western Washington, but is of little consequence in the central irrigated valleys. Portions of the Snake River and Columbia River valleys are visited each year by the disease, occasionally in epiphytotic (epidemic) form when the season is cold and backward.



### **Predisposing Factors**

The season plays such an important part in the occurrence of the disease that the weather has often been held solely responsible for the trouble. Cool, damp weather at the time of infection is necessary for the appearance of the disease in epidemic form. Leaf curl is not serious in seasons when little or no rain occurs as the buds are swelling and the leaves are unfolding. However, it is not safe to delay spraying until the rains come as the period of infection is short and once the disease has started, no amount of spraying will control it.

### **Symptoms and Effects**

The first appearance of the disease is noted as the leaves are unfolding. Diseased leaves at this stage are noticeably reddened and become thickened and much curled and distorted as they develop. The green color of the leaf is destroyed very early in the progress of the disease. Any portion or the whole of a leaf may be involved and a part or all of the foliage on the tree may be destroyed depending on the severity of the attack. As the season advances, affected leaves lose their red color and the upper smooth surface becomes gray and powdery from spore production. If cool, moist weather continues, the leaves remain in this condition for some time before they shrivel up and fall from the tree. Dry weather hastens the withering of the diseased leaves. The loss of foliage stimulates the tree to put out a new crop of leaves at the expense of its vitality.

Occasionally twigs are affected by the leaf curl fungus. In severe cases the end of the shoot is enlarged for as much as four or five inches. Most of the leaves on such a shoot are affected. Claims have been made that in succeeding years, leaves produced on diseased twigs would become affected from that source. This is a source of infection that cannot be entirely overlooked.

Trees severely affected by leaf curl seldom hold the set of fruit and fewer fruit buds are formed for the succeeding year. The tree if well cared for will recover from an attack of the disease, but one or more crops may be lost, depending on the severity of the attack. Defoliation in successive seasons greatly weakens the tree and predisposes it to winter injury. Such trees will produce neither good peaches nor many of them. An occasional epidemic of leaf curl may not permanently injure the orchard, but the loss of a single

crop of fruit will more than offset the cost of spraying for several years. Annual spraying where leaf curl is at all prevalent is cheap insurance.

### The Cause

Lear curl is caused by a fungous parasite to which the name *Exoascus deformans* has been given. It, in common with other microscopic plants of its class, reproduces by mean of spores. These spores serve the same purpose as seeds in the higher plants and carry the parasite over from one season to the next. They are mature at the time the curled leaves take on the light, powdery appearance



Fig. 2 Severely infected leaves.. Note the curling and distortion. The tip only of each is not attacked.

and are then disseminated by the wind to all parts of the tree. Although they are very small and apparently without much in the way of protective coating, the spores find lodgement under bud scales and upraised fragments of bark. There they survive the heat of summer and the cold of the following winter. In the spring as soon as the buds begin to expand, these spores are in a favorable location to grow and cause infections of the young leaves.

As noted above a few leaf infections may come from diseased shoots. Infections from this source, however, are few compared with the total number of infections taking place. Effective protection against infection from the spores will, therefore, satisfactorily control the disease. Control is much simplified because infections take place only as the buds are expanding. Once infection has occurred and the fungus has entered the leaf, the time for control is past.

### Control

Leaf curl is one of the simplest diseases to control because of the single spore form and the short period of infection. Inasmuch as but one application of spray is made, it is more essential that the spraying be thoroughly done. Every bud must be covered and cracks and crevices must be filled in order to reach all the spores. Experiments and practice have shown that fall applications of fungicide are as effective as spring applications. The period between the falling of the leaves and the onset of freezing weather is especially favorable because the soil is firm and the pressure of other work generally not so great as in the spring. If the spraying is delayed until spring, it must be done before the buds begin to swell. Infection takes place soon after the buds begin to expand and then the time for control is past. Spraying after the disease appears is time and material wasted as far as control of leaf curl is concerned. Once the fungus is inside the leaf, it can not be killed unless the leaf is destroyed.

**\*Bordeaux mixture.** A number of the liquid sprays are effective. Bordeaux mixture has long been recommended for this disease and is very efficient. The 3-3-50 formula has given good results in some localities, but the 4-5-50 or 5-5-50 strength is more generally recommended. In a few localities even better protection has been obtained with a still stronger spray (6-6-50 or even 8-8-50).

**Lime-sulphur** gives satisfactory control and has some advantage because of its value in the control of San José scale. The winter strength made by diluting the home-boiled or commercial concentrate (26-32 degrees Beaumé), one gallon to 8 to 15 of water, should be used.

**Plain copper sulphate** (bluestone) 2 pounds to 50 gallons of water may also be used effectively against leaf curl. The copper



sprays have no value against insects and should not be used in preference to lime-sulphur where insects must also be controlled.

Again it can not be too strongly stated that the best spray applied in the most thorough manner is of no value after the leaves are infected.

Application, to be effective, must be made before the buds begin to swell.



Fig. 3 Section of peach leaf affected with leaf curl. Asci containing ascospores are forming on upper surface; a, cuticle of leaf; b, bits of mycelium of the fungus; c, young asci with spores not yet formed; d, spores just formed; e, spores being divided into smaller ones; f, spores discharging; g, empty ascus. After Swingle. Mont. Agri. Exp. Sta. Cir. 37, 1914).

In addition to spraying, it is well to cut out enlarged twigs when pruning so as to eliminate danger from twig infection. It may again be stated that trees affected with leaf curl should receive the best of care and culture to enable them to overcome the drain occasioned by the loss of foliage and the production of a new crop of leaves.

\*See Ext. Bul. 41 for methods of preparation of Bordeaux mixture.

Published and distributed in furtherance  
of the Act of May 8, 1914, by the State  
College of Washington, Extension Service,  
S. B. Nelson Director, and U. S. Depart-  
ment of Agriculture cooperating.